

availed himself (would that he had discovered the lost *Fauna Calpensis* of John White !) are the various papers on Spanish Ornithology, by Lord Lilford and Mr. Howard Saunders, published in the *Ibis*, and the late Mr. C. F. Tyrwhitt Drake's notes on the birds of Tangier and Eastern Morocco, which appeared in the same journal. The list of Tangerine birds by Herr Carstensen (*Nau-mannia*, 1852, i. pp. 76-79) gave but little help ; but our author does not seem to have been aware of the late Mr. G. W. H. Drummond Hay's observations (*Proc. Zool. Soc.* 1840, pp. 133-135), which, though brief, appear to be at least trustworthy.

Colonel Irby catalogues 335 species as unquestionably occurring within his limits, besides some twenty-five more which may be reasonably looked for, though he himself has not fallen in with them ; while many others are doubtless to be found as stragglers, for "so local are birds in Southern Spain, that perhaps some may be resident and overlooked in consequence of the exact locality they frequent having been unvisited." His remarks on all these are exceedingly discriminative and to the point, furnishing a supply of information for which ornithologists will be duly grateful, but they are mostly of too special a kind to give extracts from them here. We prefer quoting what he has to say on Migration, as being a subject in which more of our readers will take interest :--

"Without doubt caused by the absence or abundance of food, which in turn is caused by difference of temperature, the passage of birds in these parts begins with most species almost to a day in spring, usually lasting for about three weeks, though some, as the Hoopoe and the Swallows, are more irregular in their first appearance ; and with these the migration lasts throughout a longer period.

"Few (indeed hardly any birds) do not migrate or shift their ground to some extent. I can name very few which do not appear to move, viz., Griffon-Vulture, Imperial Eagle, Eagle-Owl, Blue Thrush, all the Woodpeckers, Treecreeper, Black-headed Warbler, Dartford Warbler, Crested Lark, Chough, Raven, Magpie, Red-legged and Barbary Partridges, and the Andalucian Quail. Generally speaking, it seems to me that in the vernal migration the males are the first to arrive, as with the Wheatears, Nightingales, Night-herons, Bee-eaters ; but this is a theory which requires more confirmation. Some species, as the *Neophron* and most of the *Raptores*, pass in pairs.

"Most of the land-birds pass by day, usually crossing the Straits in the morning. The waders are, as a rule, not seen on passage ; so it may be concluded they pass by night, although I have occasionally observed Peewits, Golden Plover, Terns, and Gulls passing by day.

"The autumnal or return migration is less conspicuous than the vernal : and whether the passage is performed by night, or whether the birds return by some other route, or whether they pass straight on, not lingering by the way as in spring, is an open question ; but during the autumn months passed by me at Gibraltar, I failed to notice the passage as in spring, though more than once during the month of August, which I spent at Gibraltar, myself and others distinctly heard Bee-eaters passing south at night, and so conclude other birds may do the same.

"... Both the vernal and autumnal migrations are generally executed during an easterly wind, or Levanter ; at one time I thought that this was essential to the passage, but it appears not to be the case, as, whether it be an east or west wind, if it be the time for migration, birds will pass, though they linger longer on the African coast before starting if the wind be westerly ; and all the very large flights of *Raptores* (Kites, Neophrons, Honey-

Buzzards, &c.) which I have seen passed with a Levanter. After observing the passage for five springs, I am unable to come to any decided opinion, the truth being that, as an east wind is the prevalent one, the idea has been started that migration always takes place during that wind. Nevertheless, it is an undoubted fact that during the autumnal or southern migration of the Quail in September they collect in vast numbers on the European side if there be a west wind, and seem not to be able to pass until it changes to the east ; this is so much the case that, if the wind keeps in that quarter during the migration, none are hardly to be seen.

"On some occasions the passage of the larger birds of prey is a most wonderful sight ; but of all the remarkable flights of any single species, that of the Common Crane has been the most noteworthy that has come under my own observation.

"On the Andalucian side, the number of birds seen even by the ordinary traveller appears strikingly large, this being, no doubt, in a great measure caused by the quantity which are, for ten months at least out of the year, more or less on migration ; that is to say, with the exception of June and July, there is no month in which the passage of birds is not noticeable, June being the only one in which there may be said to be absolutely no migration, as, during the month of July, Cuckoos and some Bee-eaters return to the south" (pp. 13-15).

For want of space we must pass over the spirited descriptions which the Colonel gives of the various localities within his limits, and his experience of several shooting excursions, the relation of which is wisely subordinated to the main object of the book. We can fully enter into his feelings when he was for two hours the unobserved observer of a vast assemblage (at the lowest computation, he says, between three and four thousand) of wild geese, for we ourselves remember watching just such a host, and under much the same circumstances, years ago on the banks of a Lapland river ; but we cannot here introduce his account. Our author has added to the value of his book by giving a list of the Mammals of Southern Spain, forty in number without counting the Barbary Ape, whose presence on "the Rock" is the origin of so many theories facetious as well as scientific ; and the volume concludes with a convenient summary of the Birds, besides a very good index. As reviewers we are of course entitled to our "growl," and this shall be that the two neat maps which illustrate the book are not drawn to the same scale, and while that of Northern Morocco, for which we are especially thankful, takes in a great deal more than Colonel Irby's district, that of Southern Spain leaves out at least as much. With this we bid him farewell.

HOFMANN'S REPORT ON THE PROGRESS OF CHEMICAL INDUSTRY

Bericht über die Entwicklung der Chemischen Industrie während des letzten Jahrzehends ; im Verein mit Freunden und Fachgenossen erstattet von Dr. A. W. Hofmann. Autorisirter Abdruck aus dem Amtlichen Bericht über die Wiener Weltausstellung im Jahre 1873. (*Report on the Development of Chemical Industry during the last Ten Years* ; in conjunction with friends and fellow-workers. Composed by A. W. Hofmann. Authorised reprint of the official report on the Vienna Exhibition of 1873. Vol. iii. Part I.) (Braunschweig : Fr. Vieweg und Sohn, 1875.)

THE Imperial Commission of Germany for the Vienna Exhibition of 1873 have put the report on the third group, "Chemical Industry," into the hands of Dr.

Hofmann, of Berlin. Considering the well-deserved international position of Dr. Hofmann, his personal influence on the development of applied chemistry as well as of pure science, and the excellent official English report he wrote on the Chemical group of the London Exhibition of 1862, no better choice could possibly have been made. Wishing to give a more comprehensive work even than that of 1862, and to do so within reasonable time, Dr. Hofmann had recourse to a subdivision of labour, and a great number of practical and theoretical chemists of different nations have contributed articles for this work. Some of these contributors, such as Professors Frankland of London, and Wurtz of Paris, occupy eminent scientific positions; others are eminently fitted for the subjects they have treated by their practical pursuits. The report is intended to come out in three parts, containing the industrial applications of metalloids, of metals, and of organic compounds respectively. The first part, which has appeared, contains the following succession of papers:—"The Elements of Water," containing oxygen, hydrogen, and also ozone and peroxide of hydrogen, by Dr. A. Oppenheim; "On Drinking-water," by Dr. Edw. Frankland; "On the artificial production of Cold and Ice," by Dr. H. Meidinger; "On Chlorine, Bromine, Iodine, and Fluorine," by Dr. E. Mylius; "On the Sulphur-industry of Sicily," by Dr. Angelo Barbaglia; "The Manufactory of Sulphuric Acid," by R. Hasen- clever, director of the Rhenania Chemical Works at Stolberg; "Ammonia," by M. Seidel, manufacturer at Amsterdam; "Nitric Acid," by Dr. Ad. Geyger; "Protoxide of Nitrogen," by Dr. O. Liebreich; "Phosphorus and its Applications," by Dr. A. v. Schrötter (the discoverer of amorphous phosphorus); "On Carbon and Graphite," by Dr. R. Biedermann; "On Sulphuret of Carbon," by Dr. O. Braun, manufacturer at Berlin; "Cyanides," by Dr. E. Meyer, director of the Koepenik Chemical Works; "Silicates," by Dr. R. Biedermann. This enumeration shows that the variety of subjects treated on in about 350 pages is too great to allow of a detailed review, and we can only say that many of these papers offer an unusual interest.

The leading idea has been to give first a short history of the manufactures in question, and then a succinct account of the latest improvements. The most prominent samples exhibited at Vienna and the prizes awarded by the jury are shortly mentioned. The book is designed by its editor to be more than a monument of the last International Exhibition, viz., a history of chemical industry in a very readable form, and a desirable addition to the existing manuals of pure and applied chemistry. He has taken great pains not only in gathering an effective staff of fellow-workers around him, but in distributing the work, adding supplementary information, and arranging the papers in a systematic form.

Very many of the communications which appear here in print are based upon letters elicited from the best known manufacturers of various countries. The second part of the Report is now about to leave the press, and the third part is expected to be printed during the coming winter. An English translation and an Italian one are being prepared at the same time.

A. OPPENHEIM

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.*]

The Spectroscope and the Weather

WE were visited here, on the 11th inst., by a very severe thunderstorm, beginning a little before noon and lasting for about an hour and a half. Anxious to confirm some observations made recently in the West Indies, in which I got from lightning a *continuous* spectrum, I took out my pocket spectroscope, and on looking through it was at once struck by the peculiarity of the spectrum. The band noticed by Prof. P. Smyth (vol. xii. pp. 231, 252) on the less refrangible side of D was very distinct, while the band (W.L.L. 5830-5680) on the more refrangible side of D was also very, though not nearly so dark, leaving the appearance of a bright yellow band over the part of the spectrum W.L.L. 5880-5830, as in the sunset spectrum, only much more marked. The A, B, and C lines were all visible; E and *b* were very sharp, *b* being easily separable into three lines; while there was also a dark band (W.L. 5040?) between *b* and F, but no lines visible beyond F. The most peculiar point, however, was the rapidity with which the spectrum varied, for, keeping the instrument pointed in one direction, each different cloud that passed differed in the intensity of the darkness of the band W.L.L. 5970-5900, which sometimes could be distinctly separated from D, while at other times it appeared quite continuous with it. The darkest bands were given by the lurid purple and pillar'd white-grey clouds. During all this time the heat had been intense, and the thunder was accompanied by light gusts of wind varying as much as 90° in direction, but about 1 o'clock rain began to fall and the abnormal bands to disappear. By 4 P.M. the band W.L.L. 5830-5680 was almost quite gone, and the band W.L.L. 5970-5900 had also become faint, appearing like a shadow cast by D, which was sharp and clear except in the light reflected from a few of the heaviest clouds. On the 12th the sky was still very much overcast and the spectrum again slightly abnormal, but not more so than I have noticed it in a thick "Scotch mist." To-day, with sky still completely overcast, the spectrum is quite normal.

The instrument used was one of Ladd's excellent small pocket spectrosopes.

C. MICHIE SMITH

F. C. Manse Keig, Aberdeenshire,

Aug. 13

Sea Elephants from Kerguelen's Land at Berlin

THE expedition sent by the German Government to observe the Transit of Venus at Kerguelen's Land has brought home a noble series of specimens.

The most interesting of these are the skins and skeletons of male and female Sea Elephants (*Cystophora leonina* = *Morunga elephanta*, Gray), adult and young. The largest male is fortunately full grown, though not old, or of so large a size as some of the skulls preserved in other museums would apparently indicate. Still it is a noble specimen, and has been admirably prepared under the direction of Prof. Peters. The skeleton, when ready, will be mounted and placed by its side in the museum.

Though the existence of this wonderful Seal was made known more than a century ago by Pernetty, and subsequently described with more or less graphic detail and exactness by Anson, Cox, Péron, and other antarctic explorers, when it inhabited comparatively accessible localities, there was, so far as I know, no full-grown male specimen in any European museum until this one reached Berlin; and it is only a full-grown male, as is well known, which possesses the remarkable nasal appendage which suggested the name "Sea Elephant." A young male can hardly be distinguished from a female. Some writers have described the appendage as a sort of trunk—more than a foot long—indeed it is so figured in the plates to Péron's "Voyage aux Terres Australes"; but Anson, speaking of those he found at the island of Juan Fernandez, compared it to the wattles of a cock. The justice of this comparison is well shown in the Berlin specimen. The appendage is there seen to be a